

1 We claim:

1 1. A hard disk drive library, comprising:

2 a first plurality of hard disk drive storage slots;

3 a first plurality of backplane connectors;

4 a first plurality of hard disk drives removably disposed within said first plurality of hard

5 disk drive storage slots, wherein each of said first plurality of hard disk drives is in physical and

6 electrical contact with one of said first plurality of backplane connectors;

7 a power source which supplies power to each of said first plurality of backplane

8 connectors; and

9 a controller, wherein said controller provides first information to each of said first

10 plurality of hard disk drives.

11 2. The hard disk drive library of claim 1, further comprising a first plurality of

12 display devices, wherein each of said first plurality of display devices is connected to said power

13 source, and wherein each of said first plurality of display devices is disposed adjacent one of said

14 plurality of hard disk drive storage slots.

15 3. The hard disk drive library of claim 1, further comprising a display apparatus,

16 wherein said display device apparatus the status of each of said plurality of hard disk drive

17 storage slots, and wherein said display apparatus displays the status of each hard disk drive

18 disposed within said hard disk drive library.

19 4. The hard disk drive library of claim 1, further comprising:

20 a first storage wall having a front and a back, a top and a bottom, and a first side and an

21 opposing second side, wherein said first plurality of storage slots is disposed within said first

22 storage wall;

5 a utilities module having a front and a back, a top and a bottom, and a first side and an
6 opposing second side, wherein said back of said first storage wall is disposed adjacent said front
7 of said utilities module; and

8 wherein each of said first plurality of backplane connectors is disposed on said front of
9 said utilities module;

10 wherein said power supply module is disposed adjacent said bottom of said first structure
11 and adjacent said bottom of said utilities module.

1 5. The hard disk drive library of claim 4, wherein said first storage wall is pivotably
2 disposed on said utilities module.

3 6. The hard disk drive library of claim 5, wherein said first storage wall, said utilities
4 module, and said power source are rectangular in shape.

5 7. The hard disk drive library of claim 6, further comprising a first door pivotably
6 disposed on said front of said first storage wall.

7 8. The hard disk drive library of claim 5, wherein said first storage wall, said utilities
8 module, and said power source are cylindrical in shape.

9 9. The hard disk drive library of claim 8, further comprising a first door pivotably
10 disposed on said front of said first storage wall and a second door pivotably disposed on said
11 front of said first storage wall.

1 10. The hard disk drive library of claim 4, further comprising:
2 a second plurality of hard disk drive storage slots;
3 a second plurality of backplane connectors disposed on said rear of said utilities module;
4 a second storage wall having a front and a back, a top and a bottom, and a first side and
5 an opposing second side, wherein said second plurality of hard disk drive storage slots is

6 disposed within said second storage wall, and wherein said back of said second storage wall is
7 disposed adjacent said back of said utilities module; and
8 a second plurality of hard disk drives removably disposed within said second plurality of
9 hard disk drive storage slots, such that each of said second plurality of hard disk drives is in
10 physical and electrical contact with one of said second plurality of backplane connectors.

1 11. The hard disk drive library of claim 10, wherein said second storage wall is
2 pivotably disposed on back of said utilities module.

1 12. The hard disk drive library of claim 10, further comprising a second door
2 pivotably disposed on said front of said second storage wall.

13. A data storage and retrieval system, comprising:
a first plurality of hard disk drive storage slots;
a first plurality of backplane connectors;
a first plurality of hard disk drives removably disposed within said first plurality of hard
disk drive storage slots, such that each of said first plurality of hard disk drives is in electrical
contact with one of said first plurality of backplane connectors;
a first switch;
a first plurality of read/write encoders;
a first plurality of communication links, wherein one of said first plurality of
communication links connects one of said first plurality of backplane connectors with one of said
first plurality of read/write encoders;
a second plurality of communication links, wherein one of said second plurality of
communication links connects one of said first plurality of read/write encoders to said first
switch;

15 a controller, wherein said controller is connected to said switch by a third communication
16 link; and
17 one or a plurality of first external servers;
18 one or a plurality of fourth communication links, wherein one of said one or a plurality of
19 fourth communication links connects each of said one or a plurality of first external servers to
20 said first switch.

1 14. The data storage and retrieval system of claim 13, further comprising:
2 a second switch;
3 a second plurality of read/write encoders;
4 a fifth plurality of communication links, wherein one of said fifth plurality of
5 communication links connects one of said first plurality of backplane connectors with one of said
6 second plurality of read/write encoders;
7 a sixth plurality of communication links, wherein one of said sixth plurality of
8 communication links connects one of said second plurality of read/write encoders to said second
9 switch;
10 one or a plurality of second external servers;
11 one or a plurality of seventh communication links, wherein one of said one or a plurality
12 of seventh communication links connects each of said one or a plurality of second external
13 servers to said second switch.

1 15. A method for storing data in, and retrieving data from, a hard disk drive library,
2 said hard disk drive library comprising a plurality of storage slots, one or a plurality of resident
3 hard disk drives removably disposed in said plurality of storage slots, a directory comprising one
4 or a plurality of resident hard disk drive volers, a controller in communication with each of said

5 plurality of resident hard disk drives, and one or a plurality of external servers in communication
6 with each of said plurality of resident hard disk drives, said method comprising the steps of:

7 inserting a non-resident hard disk drive into one of said plurality of storage slots;

8 operating said non-resident hard disk drive;

9 comparing said non-resident hard disk drive volser to said one or a plurality of resident
10 hard disk drive volsers;

11 terminating operation of said non-resident hard disk drive if said non-resident volser
12 matches one or more of said one or a plurality of resident hard disk drive volsers;

13 updating said directory to include said non-resident hard disk drive volser if said non-
14 resident hard disk drive volser does not match one or more of said one or a plurality of resident
15 hard disk drive volsers;

16 communicating said updated directory to each of said one or plurality of external servers.

17. The method of claim 15, further comprising the steps of:

18 balancing the power distribution within said hard disk drive library; and

19 optimizing the dissipation of thermal energy generated within said hard disk drive library.

20 17. The method of claim 16, further comprising the steps of:

21 monitoring the status of each of said plurality of storage slots; and

22 displaying the status of each of said plurality of storage slots.

23 18. A hard disk drive library comprising a computer useable medium having

24 computer readable program code disposed therein for optimizing power distribution within said

25 hard disk drive library, wherein said hard disk drive library comprises a plurality of hard disk

26 drive storage slots and one or more resident hard disk drives removably disposed in said plurality

5 of hard disk drive storage slots, the computer readable program code comprising a series of
6 computer readable program steps to effect:

7 monitoring the power requirements of said one or more resident hard disk drives;

8 upon a request to add a non-resident hard disk drive to said hard disk drive library,

9 estimating the power requirements of said non-resident hard disk drive; and

10 recommending insertion of said non-resident hard disk drive into one of said plurality of
11 hard disk drive storage slots based upon the combined power requirements of said resident hard
12 disk drives and said non-resident hard disk drive.

1 19. A hard disk drive library comprising a computer usable medium having computer
2 readable program code disposed therein for optimizing thermal energy dissipation within said
3 hard disk drive library, wherein said hard disk drive library comprises a plurality of hard disk
4 drive storage slots and one or more resident hard disk drives removably disposed in said plurality
5 of hard disk drive storage slots, the computer readable program code comprising a series of
6 computer readable program steps to effect:

7 monitoring the thermal energy generated by said one or more resident hard disk drives;

8 and

9 monitoring the dissipation of said thermal energy from said hard disk drive library.

1 20. The hard disk drive library of claim 19, said computer readable program code
2 further comprising a series of computer readable program steps to effect:

3 upon a request to add a non-resident hard disk drive to said hard disk drive library,

4 estimating the thermal energy generated by said non-resident hard disk drive; and

5 recommending insertion of said non-resident hard disk drive into one of said plurality of
6 hard disk drive storage slots in order to optimize the dissipation of the total thermal energy
7 generated by said resident hard disk drives and by said non-resident hard disk drive.

1 21. A hard disk drive library comprising a computer usable medium having computer
2 readable program code disposed therein for creating and maintaining a directory for said hard
3 disk drive library, wherein said hard disk drive library comprises a plurality of hard disk drive
4 storage slots and one or a plurality of resident hard disk drives removably disposed in said
5 plurality of hard disk drive storage slots, one or a plurality of resident volsters, wherein each of
6 said one or a plurality of resident hard disk drives comprises one of said one or a plurality of
7 resident volsters, the computer readable program code comprising a series of computer readable
8 program steps to effect:

9 reading the said one or a plurality of resident volsters from said one or a plurality of said
10 resident hard disk drives; and

11 storing said one or a plurality of resident volsters in said directory.

12 22. The hard disk drive library of claim 21, said computer readable program code
13 further comprising a series of computer readable program steps to effect:

14 upon insertion of a non-resident hard disk drive into one of said plurality of hard disk
15 drive storage slots, reading the volser of said non-resident hard disk drive;

16 comparing said non-resident volser with said directory;

17 generating an error message if said non-resident volser matches one or of said one or a
18 plurality of resident volsters; and

19 adding said non-resident volser to said directory if said non-resident volser does not
20 match one or more of said one or a plurality of resident volsters.